NURSES’ DECISION-MAKING IN DIFFERENT CLINICAL ENVIRONMENTS

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ANITA R. AUSTIN

DR. KAY HODSON-CARLTON-ADVISOR

BALL STATE UNIVERSITY

MUNCIE, INDIANA

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In the current hospital environment, professional nurses are charged with patient safety and are to respond as the first response team on nursing units. Nurses need clinical decision-making skills to provide safe and competent care. Different nursing practice may result in different types of decisions (Bakalis & Watson, 2005). The purpose of this quantitative exploratory study is to identify and compare what clinical decisions are made by nurses in different clinical environments; medical, surgical and intensive care units.

This is a replication of the Bakalis and Watson’s (2005) study. The study by Bakalis and Watson (2005) did not elect to directly apply a decision-making theory due to the scope of clinical areas involved in the study. However, Bakalis and Watson (2005) reference a study by Rhodes (1985) which states, models of practice are effectively decision-making models. The sample will consist of 120 medical, surgical and ICU registered nurses from a large Midwestern Urban Hospital. The Clinical Decision-Making Questionnaire (CDMQ) will consider 3 factors of decision-making; direct patient care, supervision and management decisions, and decisions related to nurses extended roles (Bakalis & Watson, 2005). The findings of this study will identify what clinical decisions are made in clinical settings.
Chapter I

Introduction

A global nursing shortage is affecting healthcare delivery. The nursing shortage in the United States is expected to climb with an estimated shortage of 260,000 registered nurses by the year 2025 (Rother & Lavizzo-Mourey, 2009). There are currently more nursing positions available than the number of nurses graduating from nursing school.

The American Nurses Association (2009) states that nurses represent the backbone of the American health care system. The current health environment is increasingly complicated and challenging. The patient acuity is increasing yet the patient length of stay has declined by 25% since 1980. Advances in health care technology and the influx of new pharmaceuticals add to the complexity of care and the ability of caregivers to keep pace (The Joint Commission, 2009). Nurses are expected to assimilate large amounts of information and think through complex and potentially critical situations (Bittner & Gravlin, 2009). The number of experienced nurses is limited; this leaves new graduate nurses without adequate mentoring and support. New nurses lack expertise in patient care and clinical decision-making (Duchsher, 2008). Del Bueno (2005) reports that only 35% of new RN graduates have adequate clinical judgment skills needed to meet the expectations in the clinical environment.

Development of nurses’ clinical decision-making is critical for safe quality patient care (Lunney, 2009). Quality care has become the primary focus of regulatory agencies
reviewing health care facilities. Lunney (2009, p. 5) stated, “health care providers can only provide quality-based care when they have sufficient intelligence and critical thinking competencies to use existing knowledge to provide health care services.” Lunney (2009) indicated that critical thinking is required to process knowledge; knowledge alone is insufficient. Tanner (2006) indicated that clinical judgment is considered a necessary skill for professional caregivers. Hardy and Smith (2008) stated that competent clinical decision-making is a minimal expectation patients should receive from their health care providers.

American Association of Colleges of Nursing (AACN) (2009) has identified the need for nursing students to developed clinical decision-making skills. The AACN (2009) established essentials of baccalaureate education for professional nursing practice. Included in these recommendations is safe, quality patient care and use of clinical reasoning with the capability of managing simple or complex situations found in nursing practice. Basic organizational and systems leadership for patient safety and quality care is also an essential element of professional nurses’ baccalaureate education. This element is supported through the skill of critical decision-making. The AACN (2009) defined critical thinking as all or components of questioning, analyzing, synthesizing, interpreting, gaining inference, reasoning (inductive and deductive), creativity, intuition, and application (AACN, 2009). Nursing research has used various terms interchangeably such as, clinical decision-making, nursing process, clinical problem solving and critical thinking (Benner, Tanner, & Chelsa, 2009).

Banning (2007) identified three primary models for clinical decision-making in the literature. Nursing adopted the information-processing model, which is a hypothetico-
deductive approach to clinical decision-making (Banning, 2007). This model is based on the rational thought of the decision-maker. The stages of this model include cue recognition, generation of a hypothesis, interpretation of cues, and evaluation of the hypothesis (Tanner, Padrick, Westfall, & Putzier, 1987). The challenges presented by the information-processing model are dependent upon the information available at the time of the decision (Banning, 2007).

The intuitive-humanist model’s focus is on intuition and the learning gained from nursing experience and relationship between these factors. The development of the nurses’ decision-making through this relationship is the focus of this decision-making model (Banning, 2007). A major criticism of this model is the lack of scientific reasoning. However, Benner et al. (2009) recognizes that the study of clinical judgment through methods and models fails to grasp all aspects of clinical judgment. The contextual aspects of the situation are vital to understanding the development and function of a nurse’s clinical judgment (Benner et al., 2009).

O’Neill, Dluhy, and Chun’s (2005) clinical decision-making model is identified as a hybrid model by Banning (2007). This model is grounded on a computerized decision support system (CDSS). The model is a multidimensional model. O’Neill et al. (2005) developed this model based on research findings from studies of graduate students, the novice to expert clinical reasoning model and subjects defined as qualified nurses. This model contains five elements including, pre-encounter data, anticipating and controlling risk, the provision of standard nursing care, client and situational modifications, and finally hypothesis generation and testing (O’Neill et al., 2005).
O’Neill’s et al. (2005) clinical decision-making model has limitations. The foundational research includes evaluation of current literature and the novice study selected was a small study of decision-making in a simulated-clinical environment (Banning, 2007).

Tanner’s (2006) review of the literature for clinical judgment and clinical decision-making revealed three dominant questions. The first question in the literature is what are the processes nurses use when assessing patients’ clinical data, interpretation of the data and intervention. The second question is related to the function of experience and knowledge in thinking processes and finally what elements influence clinical reasoning patterns.

Tanner (2006) identified research based on statistical decision theory, information processing theory and judgment studies based on a clinical problem or issue. According to Tanner (2006), early works of clinical decision-making used case scenarios and talk aloud techniques. Current research methods attempt to evaluate clinical decision-making in the actual clinical environment using self report, chart audit, observation, or interviews. Tanner (2006) concludes that the elements a nurse brings to a situation are vital to understanding clinical decision-making. This review and evaluation of the literature by Tanner (2006) assisted in the development of the Tanner’s Clinical Judgment Model. This model addresses how nurses think with components of noticing, interpreting, responding and reflection in and on action. Tanner (2006) believes that decision-making evolves from a specific situation as the nurse brings concern and engagement to the event.
Benner (1984) reports that new nurse’s function at a novice or advanced beginner level. Fero, Witsberger, Wesmiller, Zullo, and Hoffman (2009) stated that further development of clinical decision-making skills are needed especially for the new graduate nurse. Various studies related to nurses clinical decision-making focus on this skill development for students. Additional research of clinical decision-making in the clinical environment with new and current practitioners is needed for greater understanding of nurses’ clinical decision-making (Fero et al., 2009).

Background and Significance

The introduction to the concept of clinical decision-making began with the teachings of Florence Nightingale in 1859 (Nightingale, 2003). Nightingale instructed nurses in observation and interpretation. Nightingale identified the most important lessons to teach a nurse are how and what to observe including indication of the patient’s improvement or decline. She further states that if the skill of sound observation is not achieved, one should abandon being a nurse. Nightingale (2003) stated the remarks found in her writings apply even more to care of children, surgical and medical patients.

George (2002) stated that the classic nursing process model has offered a structured systematic approach to nursing care. This tool was intended to be utilized by nurses to assist in decision-making. According to George, the early literature on the nursing process included assessment, planning with outcomes, intervention, and evaluation. Nursing diagnosis has been included as a separate component of the model fitting into the assessment phase. In recent years, the nursing practice has expanded the focus on outcome based care. Pathways and practice guidelines have become an extension of the nursing process (George). According to Tanner (2006), the nursing
process is effective in teaching a type of nurse problem solving, but does not adequately address the complexity of thought surrounding clinical decision-making. Tanner further stated that limiting the education of nurses to the nurse practice model exclusively may result in a major disservice to nursing students. Smith Higuchi and Donald (2002) reported that models used to evaluate clinical decision-making have been beneficial, but lack the variety of thinking processes needed in a professional work environment.

Three studies since 1984 have evaluated methods of skill attainment and the use of this knowledge in practice by expert nurses. Each study identified was based on the Dreyfus Model of Skill Acquisition (Benner, et al., 2009). Benner (1984) defines skill and skilled practice as implementation of clinical judgment and skilled nursing intervention in the clinical setting. Tanner (2006) acknowledged that clinical decision-making is very complex. Tanner stated that clinical judgments were affected by what the nurse brings to the situation. The knowledge a nurse brings increases with experience in nursing practice. The contextual elements have a profound effect on decision-making in the acute care environment. These included the political and social components in the nurses’ surroundings (Tanner). Benner, et al. (2009) reported understanding the development of clinical decision-making can contribute to promoting education and developing health care practitioner.

Nurses use various reasoning strategies. Tanner (2006) identified three patterns of reasoning within the literature. The patterns of reasoning by experienced nurses included analytical processes, narrative thinking and intuition. According to Tanner, the literature indicates that there was no reasoning pattern which worked for all nurses in all situations.
Lunney (2009) stated that nurses were responsible for the reliability of their interpretations of medical information. Accountability to patients, and the public was the nurses’ professional duty. To achieve positive outcomes for patients’ the professional nurses’ actions must include accurate clinical decision-making to interpret and intervene appropriately.

Tanner (2006) acknowledged that much of the nursing research has focused on clinical decision-making in critical care areas with limited information related to other areas of practice. Smith Higuchi and Donald (2002) recognized the importance of the contextual influence to nurses in decision-making therefore evaluate thinking processes in medical and surgical areas of practice. This study was significant, as the findings will provide evidence of nurses’ clinical decision-making in different area of nursing practice (Bakalis & Watson, 2005).

Problem Statement

In the current hospital environment, professional nurses were charged with patient safety and responded as the first response team on nursing units. Nurses need clinical decision-making skills to provide safe and competent care. Different nursing environments may result in different types of clinical decisions (Bakalis & Watson, 2005). Further study is needed in all areas of nursing practice regarding clinical decision-making.
**Purpose of the Study**

The purpose of this study is to identify the clinical decisions in different clinical environments: medical, surgical, intensive care units, and compare what clinical decisions were made by the nurses in these environments. This was a replication of Bakalis and Watson’s (2005) study.

**Research Questions**

1. What clinical decisions do nurses make in medical, surgical and intensive care units?

2. Do different clinical environments effect nurses’ clinical decision-making?

**Organizational Framework**

This replication study used an organizing framework by Fineberg (1981). Fineberg (1981) identified four reasons for use of decision-making theory. These included the ability to manage large volumes of clinical information, a common strategic framework to achieve effective care management decisions, the ability to improved resource allocation, and to assist the practitioner in honoring the patients’ values and treatment preferences (Fineberg, 1981).

This organizational framework was appropriate for this study because it offered support to the investigation of nurses’ clinical decision-making in different clinical environments (Bakalis & Watson, 2005). The four reasons for use of decision-making theory were applicable to each clinical area identified for this study; medical, surgical and intensive care units (Fineberg, 1981).
**Definition of Terms**

*Conceptual Definitions*

1. **Clinical decisions**: Decisions related to direct patient care, supervision and management decisions and decisions related to nurses’ extended roles (Bakalis & Watson, 2005).

2. **Clinical decision-making**: decision-making in nursing. The management of a range of information to make a professional judgment (Gambrill, 1990).

3. **Medical care area**: A clinical area that often includes older patients, which are hospitalized for longer periods of time (Bakalis & Watson, 2005).

4. **Surgical care area**: clinical area for surgical patients. This care area includes pre-operative and post-operative care (Bakalis & Watson, 2005).

5. **Critical care area**: clinical area for critically ill patient. This care area includes both coronary and intensive care patients (Bakalis & Watson, 2005).

*Operational Definitions*

1. **Clinical decision-making questionnaire (CDMQ)**: an instrument to measure clinical decision-making. This tool measures decisions related to direct patient care, supervision and management decisions and nursing decisions related to nurses’ extended roles. This questionnaire used a four point Likert scale (Bakalis & Watson, 2005).

2. **Demographic characteristics**: this includes age, sex, clinical area, qualifications and experience. These will be obtained with the CDMQ questionnaire tool (Bakalis & Watson, 2005).
Limitations

One of the major limitations of this study includes the sampling frame. The sample was obtained from one hospital. This eliminates the possibility for generalization of the study findings. The use of a convenience sample may allow for misrepresentation of the population. The questionnaire limited the assessment of clinical decision-making to three elements. An additional limitation is the methodology used for this study. Clinical decision-making is measured best with a quantitative and qualitative approach to capture the elements that the nurse brings to the situation (Bakalis & Watson, 2005).

Assumptions

The clinical statements developed for the CDMQ are clinical decisions common to nurses in nursing practice. The statements created for the questionnaire were formulated from common nursing texts (Bakalis & Watson, 2005).

Summary

Understanding of clinical decision-making in different clinical environments is needed to improve nursing education and professional development (Bakalis & Watson, 2005). The purpose of this study was to assess nurses’ clinical decision-making in medical, surgical and intensive care units. The organizational framework defined by Fineberg (1981) provided the structure to support the investigation of clinical decision-making in various clinical environments. It is vital to understand clinical decision making in nursing practice. This research will permit comparison of decision-making by nurses in different areas of practice (Bakalis & Watson, 2005). The knowledge obtained by this investigation will add to the body of literature of clinical decision-making in nursing.
Effective clinical decision-making is a vital function of the professional nurse (Lunney, 2009).
Chapter II

Review of the Literature

Introduction

The health care environment continues to offer new challenges with increased acuity, limited staff, and advanced technology. In an acute care facility, nurses are responsible for the delivery and oversight of patient care. (Carpenito, 1991). Sound decision-making is necessary to achieve safe and effective nursing care (Bakalis & Watson, 2005).

Understanding clinical decision-making and the thinking process will help nurses in clinical practice and educators gain insight into this vital nursing function. Nursing literature regarding clinical decision-making continues to develop. As early as 1859, clinical decision-making can be identified in the writings of Florence Nightingale with the emphasis of observation and interpretation of these findings (Tanner, 2006).

The purpose of this study was to identify and compare what clinical decisions are made by nurses in different clinical environments: medical, surgical and intensive care units. This is a replication of Bakalis and Watson’s (2005) study.
Organization of Literature

The literature review to support this study was divided into three sections. The first section is cognitive processes in clinical nursing; the second section is critical thinking and clinical decision-making; and the third section is decision-making computer models.

Organizational Framework

Bakalis and Watson (2005) did not elect to apply a decision-making theory due to the scope of clinical areas involved in the study. The areas of practice included in this study were surgical nursing, medical nursing and critical care nursing. Bakalis and Watson (2005) reference a study by Rhodes (1985) which states, models of practice are effectively decision-making models. Rhodes elected to assess the value of the nursing process as a sufficient model for nursing practice. The General Nursing Council for England and Wales promoted the utilization of the nursing process as a model for nursing practice and education. Rhodes purposed that the greater the similarity of a model to reality the more useful the model. Three basic elements were necessary in the health care system for this model to be effective. The first element was that nurses adopt professional ideology and professional role identity, nurses view clinical decision-making as a valued function of the nursing role and clinical decision-making support is available from leadership.

This replication study used an organizing framework based on arguments by Fineberg (1981) that have been used to justify the measurement of decision-making. Fineberg identified four reasons to utilize clinical decision-making. First, practitioners must develop methods to organize and utilize the ever-increasing volume of clinical
information. The volume of information can be supported through use of computer programs and decision analysis. Use of these resources can assist the clinician in deciphering relevant clinical information. Secondly, Fineberg identified that additional specialization in medicine has developed with the introduction of new technology. With additional specializations, communications among practitioners are vital; this communication may include quantitative terms. Practitioners need to work within a common strategic framework to assist with care management decisions. The third reason to measure clinical decision-making was related to the economic pressure in health care. Economic constraints require effective use of resources, and use of decision-making theories that may assist management with improved resource allocation. Finally, the consumers seeking more participation in their health care decisions. The use of decision-making theories can assist the practitioner in honoring the patients’ values and assist the consumer’s with selecting treatment preferences (Fineberg, 1981).

Fineberg (1981) reports that students of medical education were not prepared or taught to process decisions using strategic decision-making. Students and practitioners need to develop thinking processes in strategic terms or strategic decision-making. This approach to decision-making includes the use of quantitative methods in the clinical setting, decision analysis, the study of human cognition and clinical reasoning, computer support decision-making tools, and evaluation of cost and practice (Fineberg). Bakalis (2007) further expands on the use of decision analysis theory. Decision analysis breaks down the decision into actions and codes of data.

Weinstein and Fineberg (1980) described four steps of decision-making in the decision-analysis method. The steps included identification of the decision problems,
structuring of the problem, describe or characterize the needed information, and selecting a course of action. Weinstein and Fineberg defined each step of decision analysis. The step identification and bound of the problem included four parts, identification of alternative actions, inclusion of clinical information available, the patient’s state of health, and other considerations such as cost. The second step in decision analysis was structuring the problem. The information was aligned in a logical succession including a timeline. A decision tree is the desired outcome of this step of the process. The third step included recognition of uncertainties in the clinical event. Each component of uncertainty should be evaluated with quantitative probability. The fourth and final step in decisional analysis, selecting a course of action, requires assimilating steps 2 and 3 for the development of the action (Weinstein & Fineberg).

Weinstein and Fineberg (1980) defined decision analysis as a method that is explicit, quantitative and prescriptive. This method was structured to allow the decision maker to separate components of a situation logically. These components were then reorganizing to assist in the decision-making process.

*Cognitive Processes in Clinical Nursing*

A variety of thinking processes were required to make these complex clinical decisions. Assessment of nurses’ clinical-decision making processes may be altered if evaluated in a simulation environment. The purpose of this study was to identify and record the thinking processes that are utilized by nurses in their clinical environment (Smith Higuchi & Donald, 2002).

The study was conducted in Ontario, Canada on the medical and surgical units of a 200 bed community hospital. All the registered nurses employed by the facility during
the time of the study were invited to participate; this included both part-time and full-time nurses. The selection technique was a criterion sampling. Of the 15 volunteers, eight were selected for inclusion in the study. The nurses had documented at least five notes in a minimum of 10 patient charts randomly selected for review. Demographic considerations were observed when selecting the nurses, including day and night shift staff and part-time and full-time nurses. The nurses all had diploma level of education and 6 to 19 years of work experience in the area they were assessed (Smith Higuchi & Donald, 2002).

This study was part of a larger study using a quasi-experimental multiple time series design. Medical records of discharged patients (N=100) were randomly chosen, 50 medical and 50 surgical patient charts. The narrative responses were coded by thinking process and operation. A previously utilized table of thinking process (Donald, 1992) was employed to determine nursing exemplars. All narrative documentation in the medical unit (mean of 25 notes per nurse) and surgical unit (mean of 10 notes per nurse) was coded by thinking process and operation. The table of nursing exemplars of thinking process was developed through comparison of chart information and definitions in the model of thinking processes (Donald, 1992). Reiterated analysis of the documents was utilized to achieve consensus of the categorization of nursing exemplars. To verify the coded data, an independent researcher verified the results with an inter-rater reliability of 93% for the thinking processes and the operations rated 84%. SYSTAT statistical software analyzed the coded chart data (Smith Higuchi & Donald, 2002).

Findings indicated that nurses use many different thinking operations in documentation of information as it relates to clinical decision-making. In total, 14 different operations were noted in medical charting and 12 various operations were
identified in the surgical charts. Different thinking processes were utilized in the different areas of practice, medical and surgical units. Description was identified in 79% of the medical notes and in all the surgical notes. Evidence of selection was identified in 69% of the medical notes and 88% of the surgical notes. Inference was noted in 33% of the medical notes and 58% of the surgical notes. The process of synthesis was identified in 48% of the medical notes and 20% of the surgical notes. Finally, of the charts reviewed, verification was present in 36% of the medical notes and 8% of the surgical notes. The medical nurses were found to utilize the thinking process of synthesis and verification more often than the surgical nurses (Smith Higuchi & Donald, 2002).

Smith Higuchi and Donald (2002) concluded that clinical decision-making is a complex process. Different thinking processes were utilized in the different areas of practice, medical and surgical units. Nurses use many different thinking operations in documentation of information these included: description, selected information, inference, synthesis, analysis and verification. An important outcome of this study was the vocabulary development to describe thinking processes used in clinical decision-making (Smith Higuchi & Donald).

Clinical reasoning involves inductive and deductive reasoning simultaneously, Simmons, Lanuza, Fonteyn, Hicks, and Holm (2003) defined this as a recursive cognitive process. The purpose of this study was to explain the cognitive process experienced nurses employ during assessment of their assigned patients. The conceptual framework was the Information-Processing Theory (Newell & Simon, 1972; Simmons et al., 2003). The sample included 15 registered nurses from medical-surgical units in a teaching, community-hospital located near a large Midwestern city. The nurses were between the
ages of 26 and 34.4 years of age, five Asians and ten Caucasian. The level of education included: twelve BSN graduates, and three ADN graduates. The nurses were recruited at staff meetings and by manager recommendation. The criteria included: registered nurse without an advanced degree (certification or graduate degree), employed full-time in a medical-surgical unit for two to 10 years, and English speaking. Nurses from outside agencies, recently hired or transferred, were excluded from this study (Simmons et al., 2003).

The nurse selected the date and shift to perform the data collection. Following assessment of the patients, the nurses met the investigator for collection of the data in a quiet private, onsite location. The nurses used the “think aloud” technique and spoke into a recorder while reasoning about their patient’s assessments. Nurses referred to written notes during the session. Following the session the researcher clarified terms or medications reported. The audio tape was transcribed and categorized into sections of verbal text. Protocol analysis was the method used to review the text. Three steps involved in this method of review included: referring phrase analysis, assertional analysis, and script analysis (Simmons et al., 2003).

Referring phrase analysis, the first step, separated the information experienced nurses focused on when reasoning about patient assessment findings. Assertional analysis was the second step in Protocol Analysis. This step involved documentation of the relationship nurses formed between and in the elements identified in the referring phrase analysis. The final step in protocol analysis was script analysis. Script analysis consisted of a summary of the thinking process and plan nurses use when task reasoning. Each
transcript, coding and concept was reviewed multiple times for accuracy (Simmons et al., 2003).

Both the “think aloud” technique, and protocol analysis, were qualitative techniques. Both techniques have been used for data collection in previous studies. Protocol analysis is a qualitative approach to analyze verbal information in order to understand cognitive thinking. The think aloud technique permits understanding of thinking processes during problem solving (Simmons et al., 2003).

The findings identified focused reasoning concepts that were utilized by all the nurses. These included: amount, caregiver, condition, day, time, date, device, diagnosis, event, family, frequency, and location, missing clinical data, patient, plan, rationale, status, test, treatment, and value (Simmons et al., 2003).

The second question was answered with the use of assertional analysis. Thinking strategies and reasoning were identified and patterns developed, identifying four assertions: anticipative, causal, declarative, and evaluative. The concepts of test, treatment and problem were utilized in the development of these four assertions (Simmons et al., 2003).

The final research question was answered through script analysis and provided understanding of experienced nurses reasoning of patient assessment data. Five concepts of reasoning processes were found ranging from simple to moderate to complex. The concepts included: describe, explain, plan, evaluate, and conclude. The nurses used all these concepts in varying combinations (Simmons et al., 2003).

Simmons et al. (2003) identified the use of thinking strategies or heuristics after reviewing the information. The researchers noted 11 heuristics, demonstrating a formal
mental plan, 5 were commonly used: recognizing a pattern, judging the value, providing explanations, forming relationships, and drawing conclusions. The use of these heuristics indicated that nurses utilized additional cognitive techniques to solve clinical problems.

In conclusion, Simmons et al. (2003) captured the heuristics used by experienced nurses. The authors suggest an expert nurse may need to be identified by clinical reasoning skill and not years of experience.

Facilities including schools and institutions are obtaining human patient simulators to assist in new and continuing education of students and practitioners. According to Lasater (2007a), research is limited regarding the development of clinical judgment and care management using high fidelity simulation.

The qualitative study by Lasater (2007a) reviewed the student nurses experience with high fidelity simulation in the first term of one nursing program. This study was part of a larger study by Lasater, (2007a) which examined four dimensions of clinical judgment development. These dimensions serve as the framework for this study. The dimensions identified in the previous study of nursing students were self-reports of confidence of clinical judgment skills, capacity for critical thinking and use of clinical judgment skill through simulation. An additional dimension was the students’ experience with high fidelity simulation as reported during a focus group. The experience dimension was examined in this study (Lasater, 2007a).

Lasater (2007a) conducted this study at the Oregon Health & Science University (OHSU) School of Nursing. The study involved a high fidelity simulation experience which was conducted on one clinical day each week during the winter term for junior level nursing students. The sample included 48 nursing students; two groups of twelve
students were present in the simulation lab during a two and one-half hour session. Each group of 12 students was divided into four patient care teams with three students. One student in each team acted as the primary nurse. This position rotated during the semester.

The design of Lasater’s (2007a) study focused on the student experience of high-fidelity simulation. The students who participated and were observed in the simulation scenarios qualified to participate in a focus group. Of 39 eligible candidates, only 8 non-traditional female subjects were able to meet at a mutually agreed time. The age range of this sample was 24-50 years of age, each simulation group was represented, five of the students had prior bachelor degrees, and one student was an ethnic minority.

The data analysis for the focus group was retrospective. The focus group session was videotaped with guided questions. Following the focus group, the data was organized and categorized. After review, 13 themes were identified. These themes were reduced into five codes; strengths and limits to high-fidelity simulation, simulation creates feelings of anxiety and inadequacy yet leads to learning and awareness, a desire for more direct feedback, value of collaboration and recommendations for improved facilitation and learning (Lasater, 2007a).

Lasater (2007a) reported the most significant strengths of high fidelity simulation were assimilation of learning from various venues in the curriculum, the broad scope of experiences and anticipatory skill development for clinical situations. Weaknesses of the simulations were related to the simulator’s limits, such as, inappropriate voice, the absence of non-verbal, neurological and physiological cues.
A feeling evoked by the participants using high fidelity simulation was foreboding with awareness that the simulator could not be harmed. Participants reported learning despite the anxiety of performing in the practice scenario with high fidelity simulation (Lasater, 2007a).

Lasater (2007a) identified that positive feedback was the most common feedback provided to the students. The participants reported the desire to have additional direct feedback, including opportunities for improvement.

Collaboration was reported to assist in learning. Participants verbalized that learning occurred when observing simulation experiences through a support role followed with debriefing. Team collaboration became important as the participants recognized others strengths. The positive effect of collaboration was also discussed when listening to the stories of others (Lasater, 2007a).

Lasater (2007a) reported that the areas of improvement mentioned by the participants were more reflection with debriefing, a structured plan for those observing and more engagement time with the scenarios. Lasater (2007a) did note that the diversity of the students participating in the focus group might have limited the findings in this study. Lasater (2007a) recommended further study to evaluate the link between performance in simulation and clinical practice. Clinical training of student nurses is vital for safe patient outcomes. High fidelity simulation may offer an excellent alternative to provide clinical experiences for nursing student in a safe environment.

A professional nurse does not merely perform technical skills but was able to implement clinical judgment (Coles, 2002). Descriptive research regarding the process of clinical judgment has focused on the practice of nursing and not student development.
Development of clinical judgment occurs during specific situations. Self-reporting tools are not effective methods to measure the quality and growth of clinical judgment skills of a student or nurse. High fidelity simulation provides an opportunity to replicate specific clinical situations and develop skills in clinical judgment (Lasater, 2007b).

The purposes of this study were to explain the responses of students to simulated activities within the context of the Clinical Judgment Model (Tanner, 2006), create a rubric to demonstrate levels of achievement in clinical judgment, and utilize the rubric with student scoring to test the tool. A rubric will assist with communication, provide feedback, promote critical thinking, and provide an understanding of expectations (Lasater, 2007b).

Benner, Tanner, and Chesla’s (1996) definition of clinical judgment was used for this study. Clinical judgment is the path through which nurses gain understanding of the problems, concerns or issues of a client, address significant information, and react in a concerned and involved manner. The conceptual framework for this study was the Clinical Judgment Model developed by Tanner (2006). The Clinical Judgment Model consists of four phases: noticing, interpreting, responding, and reflecting. Tanner (2006) reinforced the concept that reflection promotes clinical learning, which is ongoing and continues to develop with each client interaction.

The Lasater (2007b) study consisted of 53 third-year nursing students in a four-year baccalaureate program. The students participated in a two and one-half hour simulated scenario in teams of three, with one participant serving as the primary nurse. During a scenario, nine students observed the simulations. The study continued for seven
weeks to complete the modification and testing of the rubric. Each student had the opportunity to experience the role of primary nurse and each team participated in a simulation weekly.

A mixed method approach using qualitative and quantitative design was selected for this study. The design method was, “a cycle of theory-driven description-observation-revision-review” (Lasater, 2007b, p. 498). Indicators of performance or performance descriptors were written for each phase of the model. Observation was conducted for three weeks as the descriptions were developed into dimensions of each phase. The levels of development recognized were beginning, developing, accomplishing, and exemplary. Prior to the observations, faculty developed identifiers to signify the worst and best behaviors within each phase. Student reasoning and understanding of a primary nurse’s role were observed during evaluation with indication of noticing, interpreting, responding, and reflecting. Weeks four and five of this study included scoring the students using the newly developed rubric. A focus group of eight students was developed to evaluate the rubric for clinical judgment concepts. Themes identified from the focus group included weaknesses and strengths of high fidelity simulation, aspiration for more direct feedback, significance of students associations with others, better facilitation, and acknowledgment that simulation creates feelings of anxiety and ignorance but increases awareness (Lasater, 2007b).

Data analysis was carried out using descriptives and ANOVA to evaluate potential influence of identified independent variables. Due to the small sample size (n=26) during weeks four and five, results for the five independent variables were not statistically significant. Twenty-six students were scored for clinical judgment skills. The
mean score was 22.98 (SD =6.07), the score range was 5-33; the total score possible was 44 points (Lasater, 2007b).

The statistical methods selected for the analysis of the data were descriptives and ANOVA to evaluate potential influence of identified independent variables. Due to the small sample size (n=26) during week four and five, results for the five independent variables were not statically significant. Twenty-six students were scored for clinical judgment skills. The mean score was 22.98 (SD =6.07), with a range 5-33, and a total score of 44 possible points (Lasater, 2007b).

The Lasater Clinical Judgment Rubric (LCJR) was developed and piloted. This rubric reflected the four phases of Tanner’s (2006) Clinical Judgment Model through 11 dimensions. This tool provided expectations for clinical performance with a common language for students and faculty. The researchers concluded the LCJR provided a method of clinical judgment assessment and would be effective in multiple settings (Lasater, 2007b).

Accurate clinical decision-making and reasoning is an important function in nursing but maybe even more vital in triage of emergency room patients. The expertise of a nurse and the influence on triage accuracy is unknown. The purpose of Goransson’s, Dhrenberg, Fonteyn, and Ehrenberg (2008) study was to evaluate RN’s cognitive processes and thinking strategies in emergency room triage with high and low levels of triage precision.

This study follows Goransson, Dhrenberg, Marklund, and Ehnfors (2006) work examining the accuracy of triage. The framework of the 2008 study was based on the Information Processing Theory (IPT) using the think-aloud (TA) method to evaluate
thinking processes of the triage nurse with emergency based scenarios (Goransson, et al., 2008).

An initial sampling from the previous study included 423 RNs working in emergency departments in Sweden. A convenience sample identified 423 nurses of the 1447 total emergency room nurses available in 48 Swedish Emergency Departments, which agreed to participate in the study. The Canadian Triage and Acuity Scale (CTAS), an international triage tool, was the measurement used to assign triage scores (Goransson et al., 2006). The RNs selected for this study participated in Goransson’s et al. (2006) previous study. RNs (n=23) that scored the highest or lowest in triage accuracy as compared with expert assessment were eligible for this study (Goransson, et al., 2008). Of the eligible nurses, 16 agreed to participate in the study representing 13 different Swedish emergency departments. The subjects ranged in age from 25 to 58 years, with 13 women and 3 men participating in the study. The years of nursing experience in the high-level triage group was a mean of 15.5 years and 10.6 years of emergency department experience. The nursing experience in the low-level triage group was a mean of 8.4 years and 3.9 years of emergency room experience (Goransson, et al., 2008).

This study was a descriptive and comparative design. The instrument to assess nurses’ triage thinking processes was the TA method in conjunction with patient scenarios. The TA method required that the participant verbalized during problem solving. The concept of TA is grounded in the IPT. This method of assessment strives to capture the participants short-term memory thought processes. Goransson, et al. (2008) created the scenarios based on their clinical experiences and events in emergency
departments. The scenarios were validated by an expert review team of three RNs; content was assessed for realism and relevance.

The TA session occurred in an office at the nurses’ work place and one session in the participant’s home. The TA session’s lasted approximately 60 minutes with a practice session provided prior to initiation of the session. The participants read the scenario aloud and verbalized thoughts aloud. The investigator took notes and remained non-verbal, except to prompt continued TA behavior. Each session was recorded for assessment of deductive content to identify thinking strategies as identified by Fonteyn (1998). This information was imported into QSR NVIVO computer software. The deductive content was coded to identify the nurses’ cognitive processes and then in-turn thinking strategies. A flow chart was created for each nurse for the researchers to analyze and score nurse’s thinking strategies. Investigators were blind to the participants they scored (Goransson, et al., 2008).

Fonteyn (1998) describes 17 thinking strategies that are used by nurses. Goransson et al. (2008) identified three strategies that were not used by nurses in this study: drawing conclusions, qualifying and making generalizations. The thinking strategies identified were assertion, generating a hypothesis, reasoning, recognition of a pattern, setting of priorities, searching for information, making predictions, forming relationships, starting a proposition, asserting a practice rule, making choices, value judging, explaining, questioning, and pondering.

The flowchart profiles of the subjects indicated three paths to triage with one utilized by 12 of the participants. These nurses gathered more information before developing a hypothesis or assigning a triage level. The nurses using the second pathway
developed a hypothesis, collected more information, and then assigned a triage level. The final pathway indicated that nurses initially assigned a triage level, developed a hypothesis followed by the collection of more information. Goransson, et al. (2008) identified that nine of the nurses moved among the steps of a given pathway and six followed a selected pathway without variation.

The findings indicated that all the nurses used similar thinking strategies. Only minor differences in the nurses’ profiles were evident. These do not attribute to accuracy of triage scores; the structure of thinking between the groups indicated no variation. Each nurse used a variety of thinking strategies and structuring mechanisms during the triage scenarios. The limitations of this study included the lack of contextual data and use of patient scenarios. Goransson, et al. (2008) noted that the most common type of reasoning was the hypothetic-deductive pattern.

Triage in the emergency department requires a number of complex skills and processes. Identification of common decision-making processes with nurses achieving triage accuracy is necessary to develop safe, accurate placement of patients and into the emergency department for the needed intervention. Additional study and research is warranted for identification of key elements and decision-making points that influence accuracy in triage (Goransson, et al., 2008).

The complexity of cognitive process in clinical nursing is evident from the literature. Nurses implement multiple complex thinking and decision-making process during their clinical practice. Capturing the thinking and clinical decision-making of nurses is optimal in actual clinical practice (Smith Higuchi & Donald, 2002) Further
evaluation of the correlation between effective and efficient decision-making and the years of experience is needed (Simmons et al., 2003).

**Critical Thinking and Clinical Decision-Making**

Nurses of varying levels of expertise are making decisions in the clinical environment that affect patient outcomes and require independent, complex problem solving skills. The purpose of this study was to examine the relationship between clinical nurse expertise, critical thinking and decision-making during a clinical simulation. The theoretical framework was based on the Benner Model of Novice to Expert and the Paul Model of the four domains of critical thinking (Martin, 2002).

The sample included 149 nursing students, graduate nurses and expert nurses selected from schools and health care agencies in the Midwest. The total sample included 136 female participants and 13 male participants. The nursing students, graduate nurses and expert nurses were from similar ADN and BSN programs (Martin, 2002).

The graduate nurses participated in the study prior to licensure. The sample consisted of 28 graduates from an ADN program and 20 graduates from a BSN program. The graduate nurse sample consisted of 54 nurses; 30 ADN diploma program graduates and 24 BSN graduates. The graduate nurse population represented experience of 5 or more years and were identified as experts by supervisors. The RN population represented seven areas of practice with a mean of 12.17 years of experience in their specialty area (Martin, 2002).

Critical thinking and decision-making quality were measured by the Elements of Thought Instrument (ETI). The ETI assesses the level of critical thinking. The 38 adjectives describing critical thinking in the ETI were differentiated on a 3-point Likert
type scale. The score range is 114 for a high critical score to 38 indicating a low score. The ETI was determined to be a valid. Cronbach alpha for reliability was reported as r=0.96 (Martin, 2002).

One of five video vignettes was randomly selected and watched by each participant. The participant verbally taped decision points while watching a 1-2 minute vignette. The ETI tool was used to determine the critical score of the taped response of each subject (Martin, 2002).

Critical thinking scores were found to be higher with the RN expert compared to student nurses and graduate nurses. When comparing the critical thinking scores of students, graduate nurses, and experienced RN group, the BSN versus ADN programs indicated no significant difference between the groups. The author found a significant difference in the quality of decision-making between each of the three groups (Martin, 2002).

The review of the demographic information indicated that the six nurses who had participated in the critical thinking course scored higher in decision-making and critical thinking. Critical thinking was noted to increase with age but this may have been related to clinical experience. GPA did correlate with increased critical thinking skills and decision-making skills (Martin, 2002).

Martin (2002) concluded that experienced nurses have a higher quality critical decision-making ability than novice nurses and students. The findings were congruent with the Benner Theory of Novice to Expert.

The National League for Nursing Accrediting Commission (NLNAC) and the Association of Colleges of Nursing (AACN) require concepts of critical thinking to be
included in the curriculum. The purpose of this study was to compare the critical thinking skills and critical thinking disposition in 3 year associate degree (ADN), 4 year baccalaureate (BSN), and 5 year RN to BSN in South Korean nursing education programs. The RN to BSN program required a 3 year ADN degree followed by a 2-year BSN completion program (Shin, Jung, Sunjin, & Myoung, 2006).

The sample consisted of senior nursing students from Seoul and four different provinces in South Korea, enrolled in an ADN, BSN, or RN to BSN nursing program. The sample included 137 ADN students, 102 BSN students and 66 RN-to-BSN students. The participants were selected through convenience sampling (Shin et al., 2006).

The authors utilized two instruments; the first was the California Critical Thinking Disposition Inventory (CCTDI) (Facione, Facione, & Sanchez, 1994). The tool measured critical thinking disposition, the CCTDI measures seven scales: truth seeking, open mindedness, analyticity, systematicity, critical thinking, self-confidence, inquisitiveness, and maturity of judgment. There are 75 items on a Likert Scale. A total score of 420 was possible for critical thinking disposition, a score less than 280 identified as weak, and a score greater than 350 defined as a strong critical thinking disposition score (Shin, et al., 2006). The Cronbach’s alpha coefficient was reported to be 0.90. In this study, the Cronbach’s alpha coefficient was 0.7847 (as cited by Shin, et al., 2006).

The second instrument was form A of the California Critical Thinking Skills Test (CCTST) (Facione, 1991). This instrument tests for critical thinking skills or cognitive skills, including analysis, inference, evaluation, and inductive and deductive reasoning. Thirty-four items were included with a total possible score of 34; the test norm was 2-29, with a standard deviation of 4.46, and an established mean of 15.89. The reliability was
reported as 0.68 to 0.70 based on Kuder-Richardson internal reliability co-efficient. Form A of the CCTST Cronbach’s alpha coefficient was 0.70. Both the CCTDI and CCTST instruments were translated into Korean; accuracy of translation was assessed by translating the tool back to English (Shin et al, 2006).

Findings addressed the three questions investigated. The first question was evaluation of nursing students’ scores of the CCTDI and CCTST; the mean score for CCTDI for all the students was 263.20. Each item of the seven scales was measured, and calculated with an established mean of 30.12 in truth seeking, 36.9 for open mindedness, 40.42 for analyticity, 35.70 for systematicity, 40.98 for critical thinking self confidence, 44.64 for inquisitiveness, and 34.43 for maturity of judgment (Shin et al., 2006). Student nurses in the study obtained a mean score of 11.36 in the CCTST below the established mean of 15.89. Students scored below the mean on both tests for critical thinking disposition and critical thinking skills (Shin et al., 2006).

The second question was to determine the difference between scores in each of the nursing programs. The results of both test revealed statistically higher scores for the BSN students. The results of the CCTDI revealed the following scores: BSN students scored 267.40, RN-to-BSN students scored 261.15 and ADN students obtained a score of 261.50 a statistical significant difference of (F=4.159, p=0.017). BSN students scored higher in the following areas: truth-seeking (p=0.003), open-mindedness (p= 0.038), critical thinking self-confidence (p=0.016), and maturity of judgment (p=0.000); these scores were statistically significant (Shin et al., 2006).

The CCTST scores were 13.33 for the BSN student, 11.42 for the RN-to-BSN student and 9.87 for the ADN student. The results indicated a statistically significant
difference between the groups ($F = 24.205$, $p=0.0001$). The BSN students scored higher in every scale on this instrument with statistical significance (Shin et al., 2006).

The final question addressed the relationship between the CCTDI and CCTST scores. The findings showed a statistically significant positive correlation ($r= 0.305$, $p=0.000$) between instruments used, the Critical Thinking Disposition and Critical Thinking Skills (Shin et al., 2006).

Shin et al. (2006) concluded the scores of these students were lower than students compared in results of other studies. The BSN students scored higher than ADN students. The study also identified a positive and statistically significant correlation between the CCTDI and CCTST scores.

The cornerstone of the nursing profession is competent decision-making in the clinical setting. The type of decisions nursing students make and how students respond to patient care decisions is unclear. The purpose of this qualitative intrinsic case study was to examine the decision-making activities of nursing students (Baxter & Rideout, 2006).

This investigation involved the decision-making activities of 12 nursing students providing care in an inpatient surgical unit in a large tertiary facility located in Ontario. The students were enrolled in the first semester of the second year of a 4 year baccalaureate nursing program. The students were assigned to a gynecological or orthopedic surgical unit with a registered and licensed practical nurse staff mix. The students were responsible for direct patient care 7 hours each week for 12 weeks under supervision of the clinical tutor (Baxter & Rideout, 2006).

Data were collected through the use of journaling and interviews. A specific journal guide was utilized to obtain responses regarding clinical decision-making. For
two weeks the students completed a journal entry after each clinical day followed by the interview. Interview guides offered direction for the interview portion of the study. Responses were audio taped and transcribed. Data were completed using inductive analysis. Information was grouped in chunks after reviewed through a constant comparative method. The information was collected, coded, and categorized (Baxter & Rideout, 2006).

Findings identified the complexity of student decision-making. Three student encounters were identified. First, the student-patient encounter, second the student-staff encounter and the third was the student-clinical tutor encounter. Within each encounter, three responses were documented and analyzed: emotional-based response, knowledge-based response, and decisions made as a result of the specific encounter (Baxter & Rideout, 2006).

The student-patient encounter was the most complex interaction and elicited the greatest number of clinical decisions. This relationship influenced all components of the decision-making process including the need for a decision, how to make a decision, and type of decisions. Emotional responses were identified most often in this category as lack of confidence and fear of decision-making (Baxter & Rideout, 2006).

The students’ knowledge base affected decision-making in two ways, it increased the students’ level of confidence and directed the students to make a clinical decisions. The decisions made in the student-patient interaction involved the students’ ability to recognize the need of decision-making regarding patient care and nursing tasks. The findings of the student-staff interaction were affected by the emotional responses of fear and confusion. The students were fearful of approaching staff due to intimidation;
confusion occurred with nursing practices that were observed versus the skills that were taught (Baxter & Rideout, 2006).

The student-staff interaction affected decision-making; the student had to make the decision to access staff as a resource. If the student requested assistance in decision-making, the student had to determine if it was appropriate to incorporate the recommendation. The interaction that elicited the least amount of discussion was the student-tutor relationship (Baxter & Rideout, 2006).

The student-tutor relationship provided a knowledge base response due to the support and general knowledge the student recognized in the tutor. The decision-making process in this relationship involved accessing the tutor for assistance; this was influenced by availability, the students’ perception, and the tutors’ response (Baxter & Rideout, 2006).

Baxter and Rideout (2006) concluded that nursing students were faced with many challenges in the clinical setting. Three primary student encounters affecting clinical decision-making were recognized in this study; the patient, the nursing staff and clinical tutor encounter. Students responses were making decisions based on emotion and knowledge.

Nurses were required to assimilate large amounts of information and make clinical decisions regarding implementation, delegation and oversight of care. At times, multiple tasks and demands resulted in missed care. Research to understand and improve critical thinking, delegation and communication would be invaluable to educators and administrators (Bittner & Gravlin, 2009). Bittner and Gravlin’s (2009) study was a qualitative, descriptive research designed to evaluate how nurses use critical thinking in
the delegation of care. This study was conducted in a 300-bed teaching facility in the United States. A group of staff nurses, nursing leadership, educators and a research investigator formed a task force to review the role of nursing delegation to unlicensed assistive personnel (UAP). The task-force identified variations of practice and knowledge gaps leading to the development of delegation guidelines and competencies for the staff. Bittner and Gravlin (2009) formed four focus groups with four to eight medical-surgical RNs. The nurses’ years of experience ranged from less than one year to 20 years. Educational background included associate and baccalaureate preparation. Enrollment in a focus group was voluntary; 27 subjects elected to participate in the study. The participants were asked to describe a clinical situation that involved delegation, include the steps of delegation, report unsuccessful and successful delegation events, and discuss missed care.

Data indicated seven categories important to critical thinking and delegation: knowledge expectation, task delegation, relationships, role uncertainty, communication barriers, system support, and omitted care. Nurses were at times unclear of policy or scope of practice when making determinations regarding delegation. This was even more relevant with new nurse graduates. Nurses assumed UAPs had critical thinking skills, conducted follow-up on delegated tasks, and would report adverse labs or vital-signs. Nurses reported that care was missed daily or many times a day. Missed care by staff included oral and skin care, basic hygiene, turning and positioning, vital signs, and ambulation. Nurses identified UAPs as responsible for missed care and exhibited resignation regarding these occurrences. Effects of delegation related to system support included staffing levels, lack of clerical support, equipment and supply issues.
Communication and relationships affected the delegation process based on the positive or negative aspects between nursing and UAPs. (Bittner & Gravlin, 2009).

Role clarification is necessary when nursing performs clinical decision-making and elects to delegate care. Missed or omitted care will affect patient outcomes and may result in adverse events. Bittner and Gravlin (2009) recommended the integration of a model of care delivery method to guide practice and establish clear expectations for positive outcomes. By combining effective communication, role clarity, collaborative relationships, and a supportive system, the clinical decision-making to delegate should be efficient in delivering safe patient care (Bittner & Gravlin, 2009).

Nursing students are evaluated for their ability to critically think and address complex clinical situations. Assessment of these skills was evaluated in school but seldom following graduation in the clinical environment. The purpose of Fero’s et al. (2009) study is to recognize learning needs for critical thinking of experienced and new nurses.

The framework Fero et al. (2009) selected was Novice to Expert Model by Patricia Benner (1984). The three objectives were explain the rate of achievement of the Performance Based Development System (PBDS) assessment; study the link between achievement of the PBDS expectations and years of experience (controlling for preparation level); and evaluation of the link between meeting PBDS expected outcomes and nurses preparation level (controlling for years of experience).

Fero’s et al. (2009) study was a post hoc retrospective analysis of the PBDS information. The PBDS assessment tool assessed the critical learning needs of the participant. This data was obtained in the first two weeks of a nurse’s employment and
included 2,144 subjects. The sample consisted of associate, diploma and baccalaureate prepared nurses. Eligible nurses were hired to work in a university health system during a 33 month period beginning in 2004. Hard copies of the PBDS summaries with demographic data were obtained of those participants that did not meet the expectations of PBDS assessment. One-hundred and three nurse scores were eliminated from analysis due to incomplete assessments (Fero et al., 2009).

The PBDS ranking was determined following a three-step process. The participants viewed 10 video vignettes and provided written clinical responses. A PBDS trained nurse rater determined an overall rating of each participant. Fero, et al. (2009) reported that the PBDS tool had been shown to be a reliable and valid tool in previous studies. The data was analyzed using SPSS version 14.0. The data included the participant’s overall PBDS rating, years of experience and educational preparation. The Pearson chi-square and chi-square test for independence likelihood ratio were used to examine differences in years of experience and educational preparation. The statistical significance level was set a priori at 0.05 (Fero, et al., 2009).

Fero et al. (2009) reported that 74.9% of the hired nurses passed the expectations of the PBDS. The nurses that completed the PBDS assessments but did not meet the scoring expectations equaled 436. The results from these assessments showed 97.2% of the nurses did not institute appropriate interventions, 67% lacked understanding in the rationale of their decisions and 57.1% lacked the ability to recognize a problem. The population of nurses consisted of 56.6% (n=1,211) graduate nurses, 197 with less than one year to five years of experience, 211 nurses with greater than five years and less than 10 years of experience, and the remaining 525 participants had greater than 10 years of
experience. Fero et al. (2009) reported that the data was statistically significant for years of experience and participants meeting or not meeting PBDS expectations. Comparing new graduates to nurses with more than 10 years of practice, the new nurse more often failed to meet the PBDS expectations (P=0.046). Further results indicate (when controlling for educational preparation) that associate degree nurses (P=0.007) and baccalaureate nurses (P<0.0001) were more likely to meet the PBDS expectations as they obtained more years of experience (Fero, et al., 2009). New graduates with a baccalaureate degree represented 29.6% of the participants failing to meet PBDS expectations. Associate degree graduates failed the PBDS expectations by 31.0%. Of the nurses with 10 years or more of experience, 11.5% of the baccalaureate nurses and 18.3% of associate degree nurses did not meet the PBDS expectations. No statistical significance was noted with the diploma nurses and years of experience. There was also no statistical significance with meeting PBDS expectations and educational preparation except when compared with years of experience (Fero, et al., 2009).

Fero, et al. (2009) identified several limitations in this study. These limitations included lack of demographics, such as gender and age, additional healthcare experience and work history. The PBDS is also based on video vignettes and not actual clinical experiences in the work environment which may alter the results.

Nurses are expected to deliver safe care with effective and efficient decision-making. This study reveals overall results that 25% of the participants in the PBDS assessment did not achieve the expected outcomes. Patient safety is a priority for healthcare providers, regulatory bodies, and consumers. Fero, et al. (2009) demonstrated
the need to accurately assess and support the nursing staff. Further research is needed to identify and attend to potential nurse deficits in clinical assessment and decision-making.

**Decision-Making Computer Models**

Different methods of supporting the novice nurse need to be utilized in developing clinical expertise and decision-making. Understanding nurses approach to clinical problems, provides insight to the decision-making process. The purpose of this study was to examine and test a computerized decision support system (CDSS) that will assist nurses in clinical decision-making. Authors developed the framework for the Clinical Decision-Making Model (CDMM) and Novice Clinical Decision-Making Model (NCRM) (O’Neill, Dluhy, Hansen, & Ryan, 2006).

The sample consisted of 12 subjects, nine nurses from a local healthcare system, and three senior-level nursing students in a baccalaureate nursing program. The education level of the nine nurses included two baccalaureate-prepared nurses, five associate-prepared nurses, and two diploma-prepared nurses. All nurses had acute care experience within the past year: they were willing to participate, and monetarily compensated for this study. The age range of the nurses was 21 to 49 years old; seven nurses had less than two years of experience; one nurse had 13 years of experience, and four nurses had three years of experience. The definition of a novice nurse was a nurse with less than two years of experience, consistent with Benner’s stages of development (O’Neill et al., 2006).

Clinical decision-making was assessed utilizing a questionnaire based on a patient case study which included high and low level questions. The scenario was a short case study of an acute care situation of a patient with COPD developing signs and symptoms of pneumonia; the scenario was reviewed individually and in focus groups. This
information was communicated to the nurses through taped verbal report and written kardex format in a private room located at a university. The researchers developed four high level questions related to the scenario requiring: recall, analysis, and evaluation of the situation. The participants individually responded to the answers in writing including rationales. Each focus group included three nurses and three research assistances; the groups were audio-taped while reviewing the scenario (O’Neill et al., 2006).

The responses to the four high level questions, aimed at encouraging critical thinking, were tallied; thematic analysis was implemented to encode the data. Patterns of information were identified, organized, and interpreted. Concepts from the CDMM and NCRM were utilized to deductively develop initial themes. Written responses from the individual’s questionnaire were analyzed line by line; the group information was analyzed using Ericsson and Simon’s protocol analysis (O’Neill et al., 2006).

The findings of this study were based on analysis of the four high level questions and the differences between the novice and experienced nurse. The first question, “What would you do for this patient?” (O’Neill et al., 2006, p. 32) elicited requests for 1 to 10 additional pieces of information from the participants. Ten pieces of information were requested by the two of the novice nurses. The novice nurse obtained further assessment information without implementing nursing actions (O’Neill et al., 2006).

Participants were to identify the patient’s problem in the second high-level question. Five experienced nurses were able to diagnosis the patient’s condition correctly, three novice nurses determined the patient had an infection of unknown origin; one novice nurse was unable to determine the patients problem (O’Neill et al., 2006).
The third high-level question included collection of information to report to the physician. The nurses in total identified 50 pieces of information or cues to report, the novice nurses collected an average of 10 cues and reported all cues. The experienced nurse identified an average of eight reportable cues and identified the specific orders they wanted from the physician (O’Neill et al., 2006).

The final high-level question was to determine if the nurse recognized deterioration of a patient’s condition. Indicators were identified for patient deterioration, an average of four indicators was selected by the nurses, and all identified the patient’s declining condition. A total of 44 indicators were cited for deterioration and no single indicator was selected by all of the nurses (O’Neill et al., 2006).

Two goals were identified and reviewed in this study. One was to determine if the computerized decision-making model (CDMM) and the novice clinical reasoning model (NCRM) framework represents nursing clinical decision-making. The data revealed that the CDMM was an adequate model of nurse decision-making; however, decision-making is so complex that it is difficult to replicate in a CDSS. The NCRM indicated that the novice nurse seeks support from the experienced nurse. During this study, only one novice nurse requested assistance; this could be a design limitation or a representation of current environment. Evaluation of the novice nurse revealed hesitation in thinking and challenges with identification of patient problems (O’Neill et al., 2006).

The second goal of this study was to examine the pneumonia practice map; asking if the map was appropriate, sequenced, and complete when linked with nurse decision-making styles. O’Neill et al. (2006) determined that the practice map was too limiting and must be expanded. The nurses questioned the reliability of the tool for practice. The
evidence used to create the tool needs to be clear to the user to avoid the “black hole” phenomenon presented by Darbyshire (2000). According to O’Neill et al. (2006), the information flow seemed adequate but the tool should be designed without a preset progression so nurses may select desired information without traversing the entire map (O’Neill et al., 2006).

O’Neill et al. (2006) concluded that the examination of a practicing clinicians thought process was the strength of this study. The subjects were able to inquire and direct the flow of care similar to a clinical experience. The study was limited by size and design. Modification or elimination of the focus group was recommended, during the sessions nurses became concerned about discussing the correct response to the case study, and not the decision-making process.

Evidence-based nursing practice is care based on the most current research or best practice standards available. Clinical practice guidelines improve evidenced-based practice and patient outcomes. Many providers regardless of the benefits do not use this tool. Clinical decision support systems (CDSS) software assists with clinical decision-making at the point of care. These programs could support evidence-based practice (Anderson & Willson, 2008).

Anderson and Willson, (2008) reviewed the development, application and implementation of CDSSs practice in nursing. This study was a metasynthesis to address three questions: (a) What advancements has nursing science made in development and implementation of CDSS? (b) What methods or theoretical models have been selected for this area of science? and (c) What CDSSs exist to help nursing with evidence based clinical decision-making?
Anderson and Willson (2008) defined CDSS as a computer application that links attributes of the patient with a computer knowledge base to aid in clinical decision-making. Evidence-adaptive CDSS is a computer function connecting clinical knowledge with current literature and practice guidelines (Sim, Gorman, Greenes, Haynes, Kaplan, Lehmann, & Tang, 2001). The tool selected for screening articles was an inclusion decision tree. Articles were English only, randomized and non-randomized clinical trials, and described a CDSS program exclusively for nurses’ clinical decision-making. This metasynthesis identified 17 articles that matched the criteria for selection, six of these articles contained evidence-adaptive clinical decision-making support. The articles Anderson and Willson (2008) reviewed for CDSS in nursing were six qualitative studies, six quantitative studies, and five studies using nonexperimental design. Specific CDSS programs for nursing support included management of wounds, pressure ulcers, cancer pain, urinary incontinence, warfarin, and mechanically ventilated neonates. Additional programs for nursing practice were patient health promotion, a telephone decision tree for acute and chronic issues, emergency triage, and novice nurse decision-making in critical care. The non-experimental designed articles evaluated the nurse satisfaction, acceptance and use of the CDSS tools (Anderson & Willson, 2008).

Common themes in the six articles with evidence-adaptive clinical decision-making tools were nursing acceptance and view of the tool, effectiveness and perceived barriers of the program, and benefits of a CDSS. CDSSs linked to evidence-adaptive concepts improved practitioners practice and evidence based decision-making (Anderson & Willson, 2008). Anderson and Willson (2008) identified that nurses were receptive to the use of CDSS. Other benefits were improved care, better multidisciplinary
communications, greater knowledge of best practice, and reliable quality care. The barriers to effective use of CDSSs were lack of administrative support, education time, and challenges with electronic medical records.

The result of this metasynthesis indicated that CDSSs in nursing science needs further development. The programs exclusively developed for nursing clinical-decision making are limited. Evaluation methods of CDSSs vary and only three studies reviewed in this article included a theoretical framework. Research is needed to determine the effectiveness of CDSS for evidence based clinical decision-making in nursing practice. Developing theory based evidence-adaptive clinical decision-making CDSSs specific to nursing practice will require a focused effort from nursing science to achieve the optimal results. The future of nursing care with these tools offers great promise for safe, evidence based care with optimal clinical decision-making (Anderson & Willson, 2008).

Patients are dependent on health care providers to make accurate clinical decisions which impact their clinical course and outcomes. Computerized systems are available in many facilities but are considered an optional tool to assist in clinical decision-making. The purpose of the article by Weber (2007) was to develop a grounded theory to greater understand Advanced Practice Nurses (APN)’s experience with computerized systems for clinical decisions in critical care environments.

Weber (2007) designed this study to address specific questions regarding decision support systems. The questions included how APNs in critical care settings use technology systems in clinical settings, the extent of usage of these systems, issues which improve or deter use of technology systems and which care decisions APNs determined to use system technology.
This study is a qualitative research design. Weber’s (2007) goal was to develop a grounded theory. This theory was inductively derived from “the phenomenon of patterns of use of computer-based decisional systems in advanced practice nursing clinical decision making” (Weber, 2007, p. 653).

The sample in this study included English speaking nurse practitioners (NP) or clinical nurse specialist (CNS) with national certifications. Other criteria included, practicing in at least one intensive care unit (ICU) within the selected six research medical facilities and access to a functioning clinical decision support system. The total sample consisted of 10 NPs and 13 CNSs participants. Of the 10 NPs in the study, 8 were White, 1 Black and 1 Latino. The 13 CNS subjects represented 11 White participants, 1 Latino and 1 Asian nurse. The length of system access ranged from 6 to more than 24 months for the participants. Of both groups, 13 nurses had more than 24 months of access and 11 had between 6 and 24 months of system access. Twenty of the total participants had class orientation to the system. Of the CNSs, two received 1:1 training on the unit and one performed self study. Thirteen of the APNs worked on a transplant, hematology or oncology unit and 10 of the APNs worked on other critical care units (Weber, 2007).

A recorded one-hour individual interview with a semi-structured interview guide was used to obtain data regarding the use of a clinical decision system. The summarized information was imported into a software program, NUD*IST 5 (Numerical Unstructured Data Indexing, Searching and Theory-Building). The instrument for data collection in this study was administered by the primary investigator. The data was analyzed with the constant comparative method (Weber, 2007).
Weber (2007) identified five themes in the data. These themes were, trusting the data, comparing system data, developing system inferences, knowledge of system technology, and system learning. The theoretical framework was identified through these themes. The subjects reported the variable, forecasting a decision outcome, as the most important variable when aligned with the themes.

Weber (2007) reported that all 23 participants used the system technology to enter data. Participants familiar with the technology used the tool to assist with forecast of outcomes. These participants were older with more clinical experience. APNs who used the technology the least had less exposure to the technology and less clinical experience. These nurses did not forecast patient outcomes with the technology.

This study indicated that 74% (n=17) of the APNs integrated all aspects of the system tool in their clinical practice. The main function of a system decision tool was to validate health providers decision-making. If the system did not support the practitioners’ plan, the recommendations were not incorporated into the patient’s care. An exception occurred when a more conservative plan, the continuation of mechanical ventilation, was recommended by the decision system. The system was also used by APNs to share information with family members. The primary reason to use the system tool was determined by the perceived benefit to the family and patient to have this additional data. Families seeking objective input received this information well and APNs experienced less anxiety communicating the information. The integration of this tool created a pattern for APNs to also predict outcomes before actual decision-making (Weber, 2007).
Weber (2007) reviewed the types of decisions and level of using of the computer-based decision-making system. The most frequent decisions included continuation of life support measures, readiness to transfer from the ICU and level of care.

Weber (2007) concluded that future use of computer-based decision-making systems will be dependent on trust of the tool, ease of use and understanding of the system. As these systems become more available, the researcher recommended that leadership will need to support the use of these resources for full integration to occur.

**Summary**

The review of relevant literature provides an overview of the current understanding of clinical decision-making. Decision-making skills and thinking process are necessary elements in nursing education and in the clinical environment. Smith Higuchi and Donald (2002) identified differences in clinical decision-making based on a nurse’s area of practice. This is an important consideration when training nursing in new clinical environments. The findings of this study by Higuchi and Donald (2002) revealed 14 different thinking operations in medical charts and 12 different thinking operations in surgical charts. Simmons, et al. (2003) also evaluated cognitive processes of nurses. Simmons, et al. (2003) identified that 15 medical-surgical nurses utilized focused reasoning concepts, 11 heuristics from Information-Processing Theory (Newell & Simon, 1972) were documented. Simmons, et al. (2003) suggested that further evaluation of Benner’s theory may be needed, to determine if clinical reasoning skills, and not years of experience should define expertise.

The study by Lasater (2007a) addressed the effects of high-fidelity simulation on the clinical judgment of the student nurse. Lasater (2007a) identified five codes when
assessing the effects of simulation on student nurses’ clinical-judgment. The codes identified were strengths and limitations of high-fidelity simulation, feelings of foreboding with learning, the desire for direct feedback, value of collaboration, and recommendations for facilitation.

An additional study Lasater (2007b) developed a tool to evaluate the effectiveness of high-fidelity simulation. This tool was based on the Tanner Clinical Judgment Model (2007b). The possible score for clinical judgment was 44, with a range of 5-33, and a mean of 22.98 (SD=6.07). The Lasater Clinical Judgment Rubric (2007b) identified 11 dimensions reflecting the four phases of the Tanner Clinical Judgment Model (2006). The Lasater Clinical Judgment Rubric (2007b) is a reliable tool for assessment of clinical judgment in various settings.

Goransson et al. (2008) concluded that all nurses used similar thinking strategies. Nursing profiles, which included experience, did not attribute to triage accuracy. Goransson et al. (2008) identified 14 of Fonteyn’s (1998) thinking strategies used by nurses. These findings also indicate numerous thinking strategies used by nurses, as did the Higuchi and Donald (2002) and Simmons, et al. (2003) studies.

Martin (2002) reported that RN experts had higher ETI scores for critical thinking when evaluating nurses’ decision-making compared to expertise during simulation. There was no statistical significance between the ASN and BSN RN scores. Martin (2002) acknowledged that student nurses benefit from a safe learning environment to foster clinical thinking.

Shin et al. (2006) reported the CCTST and CCTDI tests indicated the BSN students had statistically higher scores in all scales when compared with ADN students.
The relationships between the CCTDI and CCTST scores showed a statistically significant positive correlation ($r=0.305, p=0.000$). Following a review of the literature, Shin et al. (2006) noted that student nurses were provided with curriculum to promote critical thinking skills. Baxter and Rideout (2006) also evaluated student nurse decision-making. This study concluded that student decision-making is complex. Students’ decision-making included both emotional and knowledge based decisions. Three student nurse encounters identified in this study were student-patient, student-staff and student clinical tutor (Baxter & Rideout, 2006).

Positive patient outcomes are compromised with issues such as missed care, failure to identify and report patient changes. Bittner and Gravlin (2009) and Fero et al. (2009) identified a combination of these issues in their studies. Bittner and Gravlin (2009) reported seven categories to critical thinking and delegation. These categories included knowledge expectation, task delegation, relationships, role uncertainty, communication barriers, system support, and omitted care. Important elements in the delegation of care included effective communication, and understanding of roles and scope of practice of team members. Fero et al. (2009) evaluated newly hired experienced and graduate nurses PBDS test results. Of the nurses tested, 74.9% of the nurses met PBDS expectations. Of nurses not meeting PBDS expectations, 97.2% did not initiate nursing interventions, 65.4% did not report significant clinical information and 57.1% did not identify clinical problems (Fero et al., 2009).

Computer decision-making studies are limited in the literature. O’Neill et al. (2006) identified that the theoretical framework selected for an accurate CDM needs revision prior to implementation in practice. Further development of tools to assist
nursing in clinical decision-making will continue to grow as technology changes and advances (O’Neill et al., 2006). The challenge will be developing instruments that nurses will readily utilize. Anderson & Willson (2008) identified that evaluation methods of CDSSs vary. Of the article reviewed specific to nursing, only three studies included a theoretical framework. The use of CDM was evaluated by Weber (2007). This study revealed five themes in use of CDM, trust in the data, comparing system data, developing system inferences, understanding system use and system learning. Of the nurses participating in the study, 74% (n=17) of APNs used the tool to full potential in practice. Decisions types using the tool included continuation of life support, readiness for transfer and level of care (Weber, 2007).

The development and understanding of clinical decision-making can make a difference in patient outcomes. This skill is vital to competent nursing care. Educators and clinicians are charged with understanding and assisting in the development of this skill. Continued evaluation and development of literature will guide practice in the future.
Chapter III

Methodology

Introduction

Nurses are the patient’s advocate and primary care giver of patients with chronic and acute illnesses. Nurses are expected to respond with accurate decision-making when dealing with complex care issues. These decisions may vary with the nurses’ experience and the area of expertise (Bakalis and Watson, 2005). This study is a replication of Bakalis and Watson’s (2005) study of the thinking processes and clinical decision-making of nurses from various areas of practice.

Research questions

1. What clinical decisions do nurses make in medical, surgical and intensive care units?

2. Do different clinical environments effect nurses’ clinical decision-making?

Population, Sample, and Setting

The study will take place in Indianapolis, IN at St. Vincent Hospital and Health Care. The sample will include Registered Nurses that work in medical, surgical and intensive care units of this hospital. The units selected for this study include three adult intensive care units (ICU): adult ICU, cardiovasucular-throacic recovery (CVTR), and the cardiac care unit (CCU), with approximately 120 nurses, two surgical units: adult surgery
floor and orthopedic surgical unit, with approximately 70 nurses, and two medical units: 4 medical and 5 South medical, with approximately 80 nurses. All the registered nurses on each of the units will be given the explanation of the study and questionnaire, anticipating a 30% return rate. A total of 60 nurses, 20 medical, 20 surgical and 20 ICU participants will be included in the study. However, all questionnaires received from the units will be included in the study if the subject meets the criteria. The criterion for the participants includes full-time or part-time employment status and one year of experience in the current work area. Master prepared nurses are excluded from this study. The demographic data to be collected are age, clinical area, experience working in clinical area, years of experience in nursing, and level of nursing education.

Protection of Human Rights

It is the ethical responsibility of the researcher to protect human subjects. As nurses strive to expand the knowledge in nursing science, ethical conduct and protection of individual rights are central if public trust is to be maintained (Burns & Groove, 2005).

This is a voluntary study of Registered Nurses. This study will be submitted to the Ball State Institutional Review Board and St. Vincent Hospital and Health Care IRB for approval. The participants will remain anonymous and the information confidential. Consent to the study will be noted with the completion of the questionnaire. There are no identified risks with participation in this study or repercussions to individuals who elect not to participate.

Procedure

Following the hospital IRB and Ball State Institutional Review Board approval, the project will be introduced in the form of a letter to the Chief Nurse Officer (CNO) of
the hospital. This will explain the purpose of the study, the anticipated sample, criteria for inclusion and description of the instrument. The researcher anticipates attending to the Nursing Executive Committee (NEC) including the CNO to further explain the study details and address questions or concerns. Following approval of the CNO and NEC, a meeting with the unit directors and shared governance councils will be arranged to inform them of the approved study and explain the details of how the study will be conducted and seek unit approval. Assuming approval is received, the information will be shared at unit meetings through written information explaining the study. This information will also be sent through email to the staff of the participating units and copies will be inserted in the RN’s mailboxes. The letter of explanation will include the purpose of the study, inclusion criteria, the instrument, and the demographic information that will be collected for the study. The staff will be informed of the time commitment and type of questionnaire selected for the study. The instruction page and questionnaire will be sent electronically to part-time and full-time status RNs working on a medical, surgical and ICU clinical areas with one-year experience. The questionnaire will be returned electronically to the researcher. The questionnaire will be collated into an electronic file on the common drive that only the statistician and researcher will be able to access.

Research Design

This study will be a quantitative exploratory study; the research design will be a typical descriptive study design. The instrument to be utilized is the clinical decision-making questionnaire (CDMQ). Three factors of decision-making included in this
questionnaire are direct patient care, decisions regarding supervision and management, and decisions regarding nurses’ extended roles (Bakalis & Watson, 2005).

An exploratory study is preferred when attempting to develop knowledge of a specific area and is suited for pilot studies. A descriptive study design identifies and describes variables within the study. Exploration of nurses’ clinical decision-making in different clinical environments will provide a more clear understanding of this phenomenon (Burns & Groove, 2005).

Instrument, Reliability and Validity

Instrument

The questionnaire will utilize a 4-point Likert scale for the study. This questionnaire will be the clinical decision-making questionnaire (CDMQ), utilized by Bakalis and Watson (2005). The questionnaire and instruction page will be distributed to all registered nurses meeting the initial criteria. This tool was developed to address decision-making in nursing practice in the areas of direct patient care, supervision or management decisions, and the decisions linked to nurses’ extended roles.

Reliability

Common clinical decisions familiar to nurses were selected in the CDMQ development. The questionnaire includes 15 statements and was evaluated for structure and themes by two-nurse faculty. The questionnaire was tested for internal consistency with Cronbach’s alpha reliability coefficient. The Cronbach’s alpha was 0.83 for the questionnaire, demonstrating reliability for internal consistency (Bakalis & Watson, 2005).
Validity

The high Cronbach alpha demonstrates the value of the tool for measurement. The content and structure were acceptable for this study and determined valid by the nurse faculty experts (Bakalis & Watson, 2005).

Measures of Data Analysis

Descriptive analysis will be used to describe the clinical decisions made by nurses in surgical, medical and critical care areas of nursing practice. The Kruskal-Wallis test will be used to evaluate the difference between groups. The Pearson correlations will be used for the measurement among variables. The statistical significance level will be set for P<0.05 (Bakalis & Watson, 2005).

Summary

The expected sample of 120 registered nurses will complete a 15-item questionnaire, CDMQ, with a 4-item Likert scale. The areas of practice selected for this study are medical, surgical and critical care. Inclusion of decision-making items, which affect each practice area, is vital when comparing the data (Bakalis & Watson, 2005). Nurses need to be prepared to manage complex patients’ with evolving acute and chronic illness. The need to provide accurate and timely decision-making is critical to positive patient outcomes. Identification of nurses’ decision-making in different clinical environments will assist in targeting education and development of staff (Bakalis & Watson, 2005).
References


http://www.aacn.nche.edu/Education/pdf/BaccEssentials08.pdf

Assumptions


http://www.nursingworld.org/EspeciallyForYou/staffnurses/FAQs.aspx


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<td>Smith Higuchi &amp; Donald (2002)</td>
<td>The complex nursing care process is not captured in simulated scenarios.</td>
<td>Identify and record nurse-thinking processes in their clinical environment.</td>
<td>Model of Thinking Process (Donald, 1992).</td>
<td>8 nurses, part time or full time staff from day and night shift. Nurses have diploma level of education and 6 to 19 years of experience. Medical records of 100 discharged patients.</td>
<td>Quasi-experimental multiple time series design</td>
<td>Narrative responses were coded by thinking process. SYSTAT statistical software analyzed the coded chart data.</td>
<td>14 different thinking operations were noted in medical charts and 12 different thinking operations in surgical charts.</td>
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<td>Simmons, Lanuza, Fonteyn, Hicks, &amp; Holm (2003)</td>
<td>There is limited knowledge how nurses with experience (not experts) perform reasoning strategies.</td>
<td>Cognitive processes experienced nurses use during assessment. Questions include: nurses focus when reasoning, what information is linked together and the thinking strategies used by nurses.</td>
<td>Information-Processing Theory (Newell &amp; Simon, 1972).</td>
<td>15 registered nurses from medical surgical units. 12 of the nurses were BSN graduates and 3 were ADN graduates.</td>
<td>Qualitative descriptive study</td>
<td>“Think Aloud” technique with recorded interview. Protocol analysis was used to review the text.</td>
<td>Focused reasoning concepts were utilized by all the nurses. 11 heuristics were noted.</td>
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<td>Lasater (2007a)</td>
<td>Lack of faculty and clinical sites effect student nurse training. High fidelity simulation is an option but the effectiveness is unclear.</td>
<td>Student nurses experience with high fidelity simulation and the effect of clinical judgment development.</td>
<td>Concept of Clinical Judgment as defined by Benner, Tanner and Chesla, (1996) and several dimensions included in The Lasater Interactive Model of</td>
<td>Junior level nursing students from Oregon Health &amp; Science University School of Nursing. N=48 in simulation. N=8 in focus group.</td>
<td>Qualitative study</td>
<td>Focus group with guided questions.</td>
<td>Five codes identified were strengths and limitations of high-fidelity simulation, feelings of foreboding yet learning occurred, desire for direct feedback, value of collaboration and recommendations for facilitation.</td>
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<td>Lasater (2007b)</td>
<td>The effect of high-fidelity simulations on clinical judgment has not been established. A reliable tool is needed to measure clinical judgment with high-fidelity simulation.</td>
<td>Responses of students to simulated activities in the context of the Clinical Judgment Model, create a rubric to demonstrate levels of achievement in clinical judgment and to test the rubric tool.</td>
<td>Clinical Judgment Development.</td>
<td>53 third year nursing students in a baccalaureate program participated in scenario simulation. 26 students participated with the focus group.</td>
<td>Qualitative and quantitative design The design method was, “a cycle of theory-driven description-observation-revision-review” (Lasater, 2007b, p. 498).</td>
<td>Focus group following simulated scenarios. Data analysis used descriptive and ANOVA.</td>
<td>The possible score for clinical judgment was 44, with a range of 5-33, and a mean of 22.98 (SD=6.07). The LCJR was developed. 11 dimensions were identified using this rubric.</td>
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<td>Goransson, Dhrenberg, Fonteyn, &amp; Ehrenberg (2008)</td>
<td>Expertise of nurses and accuracy in triage assessment is unknown.</td>
<td>Evaluation of an RN’s cognitive processes and thinking strategies in emergency room triage with previous high and low triage accuracy skills</td>
<td>Information Processing Theory</td>
<td>16 RNs from 13 different Swedish emergency departments. Eligibility: participation in Goransson’s (2006) study</td>
<td>Descriptive and comparative design</td>
<td>Talk Aloud method with emergency based scenarios. Information was imported into QSR NVIVO</td>
<td>All nurses used similar thinking strategies. Their profiles did not attribute to triage accuracy. 14 of Fonteyn’s (1998) thinking strategies were identified.</td>
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<td>Martin (2002)</td>
<td>Nurses need to be able to identify and interpret changes in a patient’s condition. Teaching strategies need to meet this challenge.</td>
<td>Examine the relationship between clinical nurse expertise, critical thinking and decision-making during clinical simulation.</td>
<td>Mid-range theory, Theory of Critical Thinking of Nurses, using the Benner Model of Novice to Expert and the Paul Model of 4 Domains of Critical Thinking.</td>
<td>149 subjects including nursing students, graduate nurses and expert nurses.</td>
<td>Descriptive correlational study</td>
<td>computer software for coding.</td>
<td>RN experts had higher ETI scores for critical thinking. There was no statistical significance between the ASN and BSN RN scores.</td>
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<td>Shin, Jung, Sunjin, &amp; Myoung (2006)</td>
<td>Accredited nursing schools are required to include concepts of critical thinking in</td>
<td>Evaluation of the CCTDI and CCTST student scores for critical thinking. Identify the difference in scores between</td>
<td>Concept included critical thinking (Facione, Facione, &amp; Sanchez (1994).</td>
<td>137 ADN students, 102 BSN students and 66 RN-to-BSN students enrolled in schools in South Korea.</td>
<td>Non-experimental design, comparative study</td>
<td>California Critical Thinking Disposition Inventory (CCTDI)</td>
<td>Students scored below the mean for both the CCTST and CCTDI tests. Both tests indicate statistically</td>
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<td>Baxter &amp; Rideout (2006)</td>
<td>The type of decisions nursing students make and how they respond to patient care is unclear.</td>
<td>Examine the decision-making activities of nursing students.</td>
<td>The concept is decision-making (Baxter and Rideout, 2006) identified common themes in the literature related this concept; experience,</td>
<td>12 sophomore nursing students from a baccalaureate nursing program.</td>
<td>Qualitative intrinsic case study</td>
<td>Guided journaling and audio taped guided interviews. Data was collected, coded, and categorized.</td>
<td>Student decision-making is complex. Three encounters were student-patient, student-staff and student-clinical tutor. The decisions students make were emotional and knowledge based.</td>
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<td>Bittner &amp; Gravlin (2009)</td>
<td>Critical thinking is a needed skill for nursing including delegation.</td>
<td>How do nurses use critical thinking to delegate care?</td>
<td>Concept of critical thinking and clinical judgment (Tanner, 2006).</td>
<td>27 medical surgical registered nurses</td>
<td>Qualitative and descriptive</td>
<td>Focus group method</td>
<td>Seven categories were identified related to critical thinking and delegation.</td>
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<td>Fero, Witsberger, Wesmiller, Zullo, &amp; Hoffman (2009)</td>
<td>Patient safety is a JACHO priority. The critical thinking learning needs of experienced and new nurses must be identified.</td>
<td>Assess critical thinking needs of nurses based on the PBDS assessment tool.</td>
<td>Patricia Benner’s Novice to Expert Model (1984).</td>
<td>2144 registered nurses hired by a University Health System.</td>
<td>Post hoc retrospective analysis of PBDS assessment data</td>
<td>10 clinical video vignettes and written responses PBDS (Performance Based Development System)</td>
<td>74.9% of hired nurses met PBDS expectations. Nurses, not meeting PBDS expectations, 97.2% did not initiate nursing interventions, 65.4% did not report significant</td>
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<td>O’Neill et al. (2006)</td>
<td>Novice nurses need support with decision making in the acute care setting, there are limited expert nurses available.</td>
<td>Does the CDMM and NCRM framework represent nurse clinical decision-making? Evaluate the pneumonia practice map for a nurse CDM.</td>
<td>Clinical Decision-Making Model (CDMM) and the Novice Clinical Reasoning Model (NCRM).</td>
<td>9 nurses from a local healthcare system and 3 baccalaureate students all with acute care experience.</td>
<td>Qualitative design</td>
<td>Focus groups and individual sessions to review the scenario.</td>
<td>The results indicate that the theoretical framework needs revised for accurate nurse CDM.</td>
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<td>Anderson &amp; Willson (2008)</td>
<td>Clinical practice guidelines improve evidence-based practice and patient outcomes but many do not use the tool.</td>
<td>What is the progress of development with CDSS by nursing science? What nurse research models and methods applied to this area of study? Identify nursing CDSS to support evidenced based practice.</td>
<td>Concepts included CDSS and evidence-adaptive CDSS (Sim, et al., 2001).</td>
<td>Of 183 articles, 17 met the criteria of English only, randomized and non-randomized clinical trials and described a CDSS program exclusively for nurses’ clinical decision-making.</td>
<td>Metasynthesis</td>
<td>Automated literature search with keyword and MESH search terms were included using an inclusion decision tree.</td>
<td>Evaluation methods of CDSSs vary and only three studies reviewed in this article included a theoretical framework.</td>
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<td>Weber (2007)</td>
<td>Computerized systems are becoming available for clinical decision-making but are not used to their potential and viewed as an optional resource.</td>
<td>The study was designed to address how APNs use computerized systems in critical care, the extent of use, what improves or deter use and what decision do APNs elect to use the systems.</td>
<td>Develop a grounded theory from occurrences “of patterns of use of computer-based decisional systems in advanced practice nursing clinical decision making” (Weber, 2007, p. 653).</td>
<td>23 English speaking APNs practicing in at least 1 ICU within 6 different research facilities with access for a clinical decision support system.</td>
<td>Qualitative design</td>
<td>Individual interview with a semi-structured interview guide. Instrument for data collection was the P.I. Data was imported to NUD*IST 5 (Numerical Unstructured Data Indexing, Searching and Theory-Building).</td>
<td>5 Themes were trust in the data, comparing system data, developing system inferences, understanding system use and system learning. 74% (n=17) of APNs used the tool to fullest integration. Decisions types with the tool included continuation of life support, readiness for transfer and level of care.</td>
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